

Integrated Pest Management Alliance Grant
Urban Pest Ant Management (DPR Grant No. 07-PML-G001)

FINAL REPORT

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Introduction

The Urban Pest Ant Management Alliance was a consortium of university researchers and extension specialists, regulatory personnel, and pest management professionals (PMPs) that gathered to develop strategies to reduce the amount of pesticides applied to control urban pest ant species. The primary objective was to develop Integrated Pest Management (IPM) programs to control ants that would reduce the use of pyrethroid insecticides by 50%. In 2008, Lloyd Pest Control, Orkin Pest Control, and Western Exterminator Company provided residential routes to test satisfaction with various reduced pesticide application strategies. None of the customers were notified that they were in either the Conventional or IPM treatments to prevent any possible bias. One residential route was treated with conventional strategies and pesticides (referred to as Conventional routes) and the other was treated with reduced amounts of pyrethroids and alternative pesticides (referred to as IPM routes). In 2009, A-Pro Pest Control, Clark Pest Control, and Corky's Pest Control joined the team and also provided routes. Data concerning the amounts and types of pesticides applied at each residence, customer satisfaction, and the PMPs observations were recorded for the Conventional and IPM routes.

The following report and its conclusions have been assembled from the enormous amount of data collected by the PMPs. Customer surveys, records of call-backs, and dropped accounts provided a measure of customer satisfaction with ant control on IPM and Conventional routes. Data were collected to determine if the IPM routes were economically feasible and could be readily incorporated by the pest control industry.

Goals and Objectives

This is the final report for DPR Grant No. 07-PML-G001. This final report is provided as fulfillment of Task 2.7 and Task 3.3 specified in Goals and Objectives of the grant. A two-part annual Progress Report was provided for calendar year 2008. Taken together with the Year 1 progress reports, the final report provides a continuum and chronology of the two-year project. Besides demonstrating strategies to generally reduce the use of pesticides, the specific goal of the project was to implement IPM strategies to reduce by at least 50% the amount of pyrethroid insecticide applied to control urban pest ants. Each pest control company (PMP, Pest Management Professional) Team Member kept detailed spreadsheet records for every treatment made. Several thousand treatments were made during the course of the project. Some Team Members were unable to assemble and provide data concerning the specific ant treatments they made until December 2009 or after. The delay in providing data concerning Team pesticide use precluded us from analyzing and interpreting their data for meaningful Year 2 progress reports. However, the project remained on schedule and progress was shared during the year among the Team and with DPR at regularized quarterly Team Meetings. The objectives, tasks, deliverables, and chronology of the project are shown in Appendix II.

As specified in the **Goals and Objectives**, the following tasks were accomplished:

Task 2.1 – *Success of the IPM Program*. The project to this point was highly successful. Based on analyses of Pesticide Use Reports, customer satisfaction surveys, and feedback from supervisors and service technicians for the 2008 'IPM -based' routes, Team Member pest management companies Orkin Pest Control, Lloyd Pest Control, and Western Exterminator Company elected to convert their 2008 PMA Conventional routes to IPM-based service routes for 2009. They designated both routes as 'IPM-based' routes. For 2009, the 'IPM-based' routes

from 2008 were continued, but the Conventional route became a 'Refined IPM-based' route on which they mandated that even less pesticide be used than in 2008. This provided a total of 6 IPM routes, each consisting of up to 250 customers. There were no longer 'Conventional' routes for the project. Each PMP recorded the number of ant treatments made, time spent per application, and type and amount of pesticide used for every account. These data were provided on standardized Excel spreadsheets sent electronically to the PMA Principal Investigator (PI).

Task 2.2 - Urban Ant IPM Website. The pest ant PMA website (<http://groups.ucanr.org/UrbanAnt/>) was managed and updated periodically by Team Member Cheryl Wilen with input from the Team. Suggested relevant links were added to the Department of Entomology at UC Riverside, UC IPM, UC Pest Notes, Team and Affiliate PMP company and agency logos and advertisements, professional and PMA urban ant management seminars, the UCR Pest Management Conference, and others involved with urban pest ant management.

Task 2.3 - Information Distribution. After reviewing the results of the PMA Customer Satisfaction Survey and telephone methodology used in 2008, the Team and Affiliates agreed to use a similar telephone satisfaction survey in 2009. Each Team PMP conducted their own survey and provided the results electronically. Comparisons were made of the responses in 2008 and 2009. Results of the survey results in 2009 were positive and nearly identical to those of 2008. Results were shared with the Team and discussed. Because each Team PMP company used a customized IPM approach to control ants, each Team PMP provided individualized IPM information to their customers.

Progress and results of the urban pest ant PMA were reported by Team Members in a special session at the 6th International IPM Symposium, 24 March 2009 in Portland, OR. Progress of the project was reported as a highlight in the 2009 UC IPM Annual Report.

A summary of the project was published and in a reviewed on-line article ([http://www.extension.org/pages/Group Advises How to Control Ants Without Harming the Environment](http://www.extension.org/pages/Group+Advises+How+to+Control+Ants+Without+Harming+the+Environment)) prepared by S. Klunk, Communications Specialist, UC Statewide IPM Program. The article was posted on three IPM websites.

A summary of results of the PMA was published by the Calif. Assoc. of Pest Control Advisors (Wilen et al. 2010).

The PMA was awarded the IPM Team Award by the Pacific Branch, Entomological Society of America for its outstanding IPM merit and achievement. The PMA is currently being considered for the National IPM Award.

Results of the project were presented at the Urban Pest Management Conference, UC Riverside, March 2010.

Task 2.4 - Recruit Affiliates. Three additional influential PMP companies were recruited to join the PMA as Affiliate Members. The affiliates were chosen because they represent a wide geographic range of California (i.e. northern and central California) and because they are credible and have influence in the pest control industry. The owners of A-Pro Pest Control (C. Payton, Campbell), Clark Pest Control (D. Van Steenwyk, Lodi), and Corky's Pest Control (C. Mizer, San Marcos) agreed to participate at Team meetings and to implement IPM measures agreed upon beforehand by the Team to control urban pest ants. They agreed to dedicate at least two Conventional service routes for 2009 and to provide the same kind of data that had been provided by the Team Member PMPs.

Task 2.5 - Develop Urban Pest Ant Training Module. Two regional day-long seminars were the basis of a training module. One conference was held in San Jose, CA and the other was held in Riverside on the UCR campus (see Appendix III). DPR, UC researchers from Davis and

Riverside, participating county agencies, and Team Members made presentations concerning the PMA and how to reduce use of pyrethroid insecticides and implement IPM techniques for ant control. More than 250 pest control professionals attended the conferences and electronic versions of their presentations were made available on the Urban Ant IPM website. The website and presentations may be used as a master training module.

Task 2.6 - Introduce Master Gardeners to the Project. The urban pest ant program was delivered in 1-day Master Gardener training programs in Santa Barbara (February 25, 2010) and San Diego, CA March 9, 2010). Highly receptive, both Master Gardener groups were encouraged by the IPM strategies developed by the PMA. The program was introduced to the Santa Barbara Master Gardeners by Team Member B. Cabrera. The program was introduced to the San Diego Master Gardeners by Team Member C. Wilen and D. Reiersen.

Task 2.7 - Workshops. As detailed in Task 2.5, the Team organized special 1-day training workshops in San Jose (November 10, 2009) and Riverside (November 19, 2009). These locations were selected to accommodate attendees from northern and southern California. The Team prepared the agenda for the meetings; flyers, advertisements, announcements, and meeting room reservations; recruited organizational assistance from the pest control industry, applied for and received continuing education credit; planned breaks and meals; solicited IPM exhibit vendors; and conducted the meetings in both locations. As required, an examination covering the topics of the meeting was administered and graded, and attendance was documented by sign-in and sign-out for educational credits. We issued certificates of attendance to attendees.

Task 2.8 - Meetings. Team meetings were held at least quarterly. Plans, schedules and progress were discussed at these meetings. Each meeting had an agenda. The meetings were held from 10:00 a.m. to 2:00 p.m. in Room 50 at the South Coast Research and Extension Center

(SCREC), Irvine, CA. Attendance was excellent, there rarely being more than 1 or 2 Team Members absent.

Task 3.1 - *Training module*. The web-based training module that consists of all the PMA IPM seminar presentations made in San Jose and Riverside have been posted and are available to PMPs and the public. Besides the basic urban pest ant IPM information developed by the PMA, the website contains a great deal of additional information concerning the people, agencies, and companies involved in the project, pest ant identification, pest ant problems in California and elsewhere in the west, water quality issues, information concerning reduced-risk pesticides, and IPM strategies and techniques that may be used to control urban pest ants.

Task 3.2 - *Meetings*. The final two PMA meetings were held in January and February, 2010 at SCREC. Team Members agreed to provide their company treatment data and results of their Customer Satisfaction survey if they had not previously done so. They also agreed to provide a brief written synopsis of their experience as members of the PMA. All data were to be provided to the PMA M. Rust, Principal Investigator. This report is in lieu of a 2010 semi-annual report.

Task 3.3 - *Final Reporting*. The proposed May 2010 meeting of the Pesticide Management Advisory Committee (PMAC) and CDPR at which the final presentation of the PMA was cancelled by DPR in advance. Instead, M. Rust, project PI, presented final progress report presentation was made by M. Rust, project PI, to PMAC and CDPR in Sacramento, CA on 12 December 2010.

To summarize, the following **Tasks, Milestones or Deliverables/Outcomes for 2009 and 2010** have been achieved since the semi-annual reports for 2008:

1. Team Meetings - Done. Meetings 5, 6, 7, and 8 held as scheduled at ANR South Coast Field Station, Irvine.
2. Oral presentation concerning Urban Pest Ant PMA at U.C. Entomology Conference - Done. March 2009 and March 2010.
3. Solicit and train Team Partners and Team Affiliate Members - Done. Partners include Sylvia Kenmuir, Target Specialty Products; N. Duggal, County of Santa Clara; Affiliates include A-Pro Pest Control, Clark Pest Control, and Corky's Pest Control.
4. Implement IPM strategies on service routes - Done. In 2009, customized IPM strategies implemented on six routes consisting of about 150 to 200 customers per route. Typical routes and dedicated routes were provided by each Team and Affiliate Member. Team provided detailed data concerning every ant treatment made.
5. Website update - Done. Team Member C. Wilen incorporated suggestion of Team and upgrades website on a regular basis. Appropriate links installed as directed. We hope that the website will be maintained by DNAR at U.C. Davis.
6. Oral presentation at PCOC annual convention - Done. Presentation made by Team Partner S. Kenmuir, Target Specialty Products.
7. Seminars - Done. Well-attended seminars planned and held in San Jose and Riverside.
8. Outreach - Done. Urban Pest Ant PMA presentations made at various meetings and seminars; prepared written and on-line articles; received IPM Award and recognition.
9. Gather and analyze data - Done. Team Members provide detailed electronic data for 2008 and Members and Affiliates provide data for 2009. Data provided to PI who analyzes and presents data in report form.

10. Final oral presentation - Done. PI presented final report in December 2009 in Sacramento to PMAC and CDPR staff.
11. Final written presentation - Done. Collaborative collection includes data, interpretation, impressions, and chronology. Report prepared and assembled by PI.

Reports

Orkin Pest Control

Orkin's participation in the Pest Management Alliance included the development and implementation of a low impact IPM-based pest management strategy for the control of urban ants that fit their corporate model. The program was based on the goals and objectives as listed in the Urban Ant Pest Management Alliance (PMA) proposal. Specifically, the goal was to reduce the amount of pyrethroid insecticide used to control ants around structures by 50%, limit the frequency of pesticide applications, and implement strategies that reduced the potential for insecticide runoff.

Route Dynamics.-Two similar adjacent routes located in coastal Orange County, CA were used for the PMA project. One route was designated as the IPM route (IR) and the other the Conventional route (CR). The IR route had approximately 375 customers, most with Every Other Month (EOM) service (236) and the CR route had 365 customers with the largest number on EOM service (226).

2008

In 2008, the IPM approach included using only targeted treatments with pyrethroid insecticides as opposed to widespread perimeter applications on the CR route. Treatment of a property on the IPM route was limited to one gallon of finished product versus approximately two gallons for the CR route. Exterior applications for properties on the IPM route were limited to nests, and "ant-active" areas, cracks and crevices or spots. Bait materials, including boric acid based granular products and low-impact gel products were used to supplement these targeted applications of pyrethroid insecticides. As well, a single application of Termidor (fipronil) insecticide was applied at the beginning of the peak ant season on both routes. Exceptions,

including the use of additional pyrethroids or a supplemental treatment with Termidor were allowed for customer callbacks or in the case of heavy ant activity (Appendix IV).

Spiders and ants were reported at 32.7% and 14.7% of the residences on the CR route, respectfully (Table 1). The technician averaged about 22.4 min/stop on the CR route. Over 8 months, the technician re-treated 252 residences (13.4% call back rate). On the IPM route, spiders and ants were reported at 91.4% and 19.2% of the residences, respectfully (Table 1). The technician averaged 23.5 min/stop. The technician re-treated 200 residences (9.8 % call back rate).

The CR route was treated with a total of 3,439 gallons of 0.02% bifenthrin spray (2,603 g AI) and it was the primary treatment applied for ants. On the IPM route, 1,837 gallons of 0.02% bifenthrin (1,391 g AI) were sprayed to control ants. There was a 56% reduction in the total amount of bifenthrin (AI, active ingredient) sprayed in the IPM route. Vegetation and shrubs were treated with bifenthrin granules. Areas close to the structure were treated with boric acid baits to control ants, cockroaches and general pests.

A post season survey of customers on the CR route revealed that 78.4% felt the service was the same or better that it had been in 2007 (n= 51 respondents). On the IPM route 84.9% of the customers felt that the service was the same or better than 2007 (53 respondents).

2009

In 2009, pyrethroid applications were further reduced. The CR route was treated with one gallon of finish spray (2008 IPM protocol, Appendix IV) and the amount of pyrethroid spray applied on the IPM route was reduced to one-half gallon of finished spray per residence. As before, exceptions were allowed to accommodate customer callbacks or heavy ant activity. Customers on both routes were not notified of the modifications to the service protocol. This

allowed unbiased surveys prior to the ant season (April 2008) and following the ant season (November 2008 and 2009).

Spiders and ants were reported 80.7% and 10.5% of the time on the CR route, respectfully (Table 3). The technician spent an average of 24.6 min/stop. Technicians re-treated 149 residences (8.1% call back rate). The technician reported spiders and ants at 10.9% and 5.8% of the residences, respectfully.

The technician applied 2,098 gallons of 0.02% bifenthrin spray on the CR route (1,588 g AI, Table 4). Flower beds and shrubs were treated with 469 oz. of bifenthrin granules. In addition, 116 g of Maxforce Killer Ant gel was used. On the IPM route, 1,124 gallons of bifenthrin (851 g AI) and 138 gallons of fipronil were sprayed. The flower beds and foliage were treated with 1,166 oz. of bifenthrin granules and 5,947 oz. of Niban FG.

There was a 46.4% reduction in the amount of bifenthrin sprayed on the IPM route in 2009. This represented a 67.3% reduction from the Conventional Route in 2008.

The initial goal of a 50% reduction in the use of pyrethroid insecticides was met on the IPM route in 2008. This same goal was achieved on both routes in 2009. The 75% reduction for the IPM route in 2009 was not successful since additional pyrethroid use or supplemental applications of Termidor were required to ensure control.

Customer surveys taken in both years did not indicate a difference between the strategy used for the IPM and that used for Conventional service. There was no significant difference in the number of call back services or cancellations when the survey results for both routes were compared.

Table 1. Summary of Orkin Pest Control routes in 2008.

<i>Conventional Route</i>						
Month	CB*	Reg.	Avg. Min/stop	Ants	Spiders	Others
April	17	222	20.9	14	63	19
May	21	223	29.2	5	77	9
June	26	185	20.0	20	60	12
July	45	211	19.2	46	83	13
August	33	206	24.7	139	148	8
September	50	201	23.6	21	95	3
October	36	196	21.5	22	72	2
November	24	190	20.7	11	19	5
total	252	1,634	22.4	278	617	71
% of stops	13.4			14.7	32.7	3.8
<i>IPM Route</i>						
April	8	240	22.9	7	242	17
May	19	232	24.5	13	236	28
June	22	210	20.3	28	220	16
July	29	232	24.5	58	231	25
August	21	239	24.4	181	240	25
September	32	218	25.2	35	221	12
October	47	240	24.3	53	244	13
November	22	221	21.6	16	223	8
total	200	1,832	23.5	391	1,857	144
% of stops	9.8			19.2	91.4	7.1

- CB = call back, Reg = regularly scheduled treatments.

Table 2. Insecticide treatments applied at Conventional and IPM routes by Orkin in 2008.

Conventional Route																	
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
April	423	0	8	0	0	20	0	2	0	5	0	0	0	3	0	0	0
May	477	0	0	0	0	31	0	0	0	0	1	0	0	3	0	0	0
June	388	0	0	0	0	6	0	0	0	0	0	0	0	2	0	0	0
July	420	0	0	0	31	24	1	0	0	2	0	4	2	3	0	0	0
Aug.	452	0	0	0	13	3	0	0	0	5	0	0	2	2	0	0	0
Sept.	454	0	0	0	10	8	0	0	0	9	1	8	0	2	0	0	0
Oct.	437	0	0	0	8	3	0	0	0	5	0	0	1	1	0	0	0
Nov.	388	0	0	0	10	4	0	0	0	2	0	0	0	2	0	0	0
total	3439	0	8	0	72	99	1	2	0	28	2	12	5	18	0	0	0
IPM Route																	
April	214	0	64	23	0	508	0	0	3	0	0	0	0	8	6	1	0
May	213	0	0	55	0	772	0	0	0	0	16	0	0	14	2		0
June	217	0	0	28	21	471	0	0	0	0	0	0	3	15	3	1	0
July	242	3	16	34	15	523	0	0	0	0	0	0	0	26	8	0	0
Aug.	235	4	46	14	27	488	0	0	0	0	0	0	0	54	0	4	0
Sept.	238	2	110	18	10	563	0	0	0	2	1	8	0	22	8	0	2
Oct.	253	1	95	8	25	639	0	0	0	0	2	0	0	14	0	0	16
Nov.	225	0	30	10	2	905	0	0	0	0	0	0	0	6	1	0	12
total	1837	10	361	190	100	4869	0	0	3	2	19	8	3	159	28	6	30

- 1 Talstar Pro (bifenthrin, 0.02%) – gal finished spray
 2 Termidor SC (fipronil, 0.06%) – gal finished spray
 3 Talstar Granules (bifenthrin, 0.2%) – ounces
 4 Maxforce Insect Granules (hydramethylnon, 1.0%) – ounces
 5 Maxforce Killer Ant Gel (fipronil, 0.001%) – grams
 6 Niban FG (orthoboric acid, 5.0%) – ounces
 7 Maxforce Fine Granule Insect Bait (hydramethylnon, 1.0%) – ounces
 8 Avert Cockroach gel bait (abamectin, 0.05%) – grams
 9 Tri-Die bulk (pyrethrins 1.0%, PBO 10%, amorphous silica 40%) – ounces
 10 Delta dust (deltamethrin, 0.05%) – ounces
 11 Precor 2000 Plus (S-methoprene 0.085%, permethrin 0.35%) – ounces
 12 Tri-Die (pyrethrins 0.6%, PBO, 4.8%, amorphous silica gel 8.0%) – ounces
 13 Wasp Freeze (D-trans allethrin 0.129%, phenothrin 0.12%) – ounces
 14 565 Plus XLO Formula 2 (pyrethrins 0.5% = synergist) – ounces
 15 Cykick (cyfluthrin, 0.1%) – ounces
 16 EcoPCO ACU (2-phenyl proprinate), 0.1%) – ounces
 17 Procitra DL (d-limonene, 10%) – ounces

Table 3. Summary of Orkin Pest Control routes in 2009.

<i>Conventional Route</i>						
Month	CB*	Reg.	Avg. Min/stop	Ants	Spiders	Others
April	11	213	24.7	9	212	8
May	14	216	24.5	25	215	19
June	17	208	23.8	24	212	3
July	19	199	25.4	20	202	21
August	21	215	23.9	30	216	12
September	31	201	25.9	42	207	15
October	28	220	23.8	28	224	11
November	8	215	25.1	15	209	9
total	149	1,687	24.6	193	1,481	98
% of stops	8.1			10.5	80.7	5.3
<i>IPM Route</i>						
April	17	199	20.4	3	14	5
May	22	202	19.8	5	4	1
June	16	186	21.3	8	10	5
July	26	173	20.7	7	7	0
August	24	188	21.4	39	44	1
September	49	201	21.1	19	28	2
October	8	200	19.7	16	32	5
November	10	234	21.5	5	52	11
total	172	1,583	20.7	102	191	28
% of stops	9.8			5.8	10.9	1.6

- CB = call back, Reg = regularly scheduled treatments.

Table 4. Insecticide treatments applied on Conventional and IPM routes by Orkin in 2009.

Conventional Route												
Month	1	2	3	4	5	6	7	10	11	14	15	17
April	209	0	0	0	35	0	0	0	0	1	0	0
May	209	0	0	0	13	0	0	0	0	1	0	0
June	223	0	0	0	0	0	0	0	0	2	0	0
July	196	0	0	0	13	0	0	0	0	2	0	0
Aug.	250	0	0	0	45	0	0	35	0	14	14	0
Sept.	278	0	0	0	2	0	0	0	0	3	0	0
Oct.	322	0	71	0	6	0	0	3	0	2	0	0
Nov.	411	0	398	0	2	8	0	2	1	0	0	0
total	2098	0	469	0	116	8	0	40	1	25	14	0
IPM Route												
April	122	0	16	6	2	806	4	30	16	14	2	2
May	120	13	214	0	0	862	23	0	0	25	3	1
June	58	103	148	2	0	496	2	1	16	10	10	0
July	143	5	74	0	0	762	23	0	16	55	4	1
Aug.	170	4	146	0	0	740	4	0	0	26	26	2
Sept.	165	11	58	0	0	494	10	0	28	152	3	0
Oct.	186	2	428	0	0	652	0	1	32	49	0	0
Nov.	160	0	82	0	0	1135	11	1	20	14	3	0
total	1124	138	1166	8	2	5947	77	33	128	345	51	6

1 Talstar Pro (bifenthrin, 0.02%) – gal finished spray

2 Termidor SC (fipronil, 0.06%) – gal finished spray

3 Talstar Granules (bifenthrin, 0.2%) – ounces

4 Maxforce Insect Granules (hydramethylnon, 1.0%) – ounces

5 Maxforce Killer Ant Gel (fipronil, 0.001%) – grams

6 Niban FG (orthoboric acid, 5.0%) – ounces

7 Maxforce Fine Granule Insect Bait (hydramethylnon, 1.0%) – ounces

10 Delta dust (deltamethrin, 0.05%) – ounces

11 Precor 2000 Plus (S-methoprene 0.085%, permethrin 0.35%) – ounces

14 565 Plus XLO Formula 2 (pyrethrins 0.5% = synergist) – ounces

15 Cykick (cyfluthrin, 0.1%) – ounces

17 Procitra DL (*d*-limonene, 10%) – ounces

Table 5. Post season customer surveys to three questions from 2008 and 2009.

Year	Route	Question	Yes	No
2008	Conventional	Were you satisfied with your ant control service in 2008 compared with 2007?	40	11
	IPM		45	8
2009	Conventional		42	6
			38	3

Year		Question	None	Light	moderate	heavy
2008	Conventional	How would you rate your 2008 summer ant problem Outdoors?	12	25	10	4
	IPM		32	12	8	1
2009	Conventional		12	14	11	6
	IPM		17	13	6	1

Year		Question	None	Light	moderate	heavy
2008	Conventional	How would you rate your 2008 summer ant problem Indoors?	19	19	9	4
	IPM		37	12	3	1
2009	Conventional		35	6	2	5
	IPM		24	10	5	0

Lloyd Pest Control

Lloyd Pest Control compared conventional ant control treatments and an IPM approach in 2008 and 2009. The goal was to reduce pyrethroid use by 50%. Additionally, applications on the IPM routes that reduced potential pesticide run-off in water from the treated property were given the highest priority.

In 2008, customers were initially surveyed by mail on both the Conventional (CR) and IPM routes prior to initiating the study (Appendix V). Nearly all of the respondents (98.8%) were satisfied with the service provided by Lloyd Pest Control in 2007. About 65% of the customers had tried to control ants prior to contacting a pest control company. Of these about 83% thought it was more important to use effective pesticides than it was using less pesticides. However, 55% responded that they would pay more for ant control techniques that used “green techniques.” Typically most of the ant problems occurred outdoors (63.9%) compared with indoors (16.5%).

The traditional residential client received four treatments per year, two applications of Termidor (fipronil) timed at the very beginning of the ant season and the second at the height of the ant activity (July and August) (Appendix IV). In addition, two applications of a pyrethroid were applied in between the Termidor applications. Pyrethroid granules were also used around heavy ground cover where spray applications do not penetrate. Bifenthrin granules were selected because Klotz *et al.* (2008) have shown it be highly effective and the treatment did not produce bifenthrin in water sample taken along the street curb (Greenberg *et al.* 2010). Typically, residential routes contained about 500 accounts, but only 165 clients were serviced each month as they were on a quarterly service. Lloyd PC serviced all residential clients on this frequency as it helped reduce pesticide usage and exposure to the client. When comparing pesticide usage on a

client that received monthly applications to quarterly there was at least a 66% pesticide reduction on that specific property. Lloyd PC had found that their 16,000 residential clients appreciated the reduced exposure while still having their pest ant populations under control.

2008

Residences on the CR route were treated with two applications of 0.06% Termidor (2.5 gallons) by back pack sprayer. In between the Termidor applications, 0.005% Cykick CS (cyfluthrin) was applied with a power sprayer and 0.025% Cykick CS was applied with a backpack sprayer. Approximately 4 gallons of finish spray were applied per residence with the back pack sprayer. The use of “no spray zones” was incorporated on the IPM routes. The areas that were excluded from treatment were 10-12 feet from the street curb, driveway areas near the street, and concrete aprons. This helped reduce indiscriminate applications and the high potential for pesticide run-off into the street. Pesticide usage was reduced greatly, but controlling where the insecticide was applied with the present spraying equipment became problematic. This approach would be difficult to control if all of their 200 applicators were required to follow this procedure.

Customers were very satisfied with the service on both CR (100%) and IPM (97%) routes (Table 3). Only 3.8% and 11.9% responded that they had indoor ant problems on the CR and IPM routes, respectfully.

2009

Argentine ants represented 86.9% and 88.3% of the pests reported on the CR and IPM routes, respectfully (Table 6). Spiders were only reported 6.2% and 4.3 % for CR and IPM routes, respectfully. Technicians averaged 28.2 and 27.8 min/ stop on CR and IPM routes,

respectfully. The percentage of residences that needed a re-treatment in the CR and IPM routes were 13.9 and 13.3%, respectfully.

Pyrethroid sprays were totally eliminated in both the CR and IPM routes. In the CR route, 686 oz. of Talstar G (bifenthrin) was scattered in flower beds, ground cover and other vegetative areas difficult to treat with sprays (Table 7). About 1 gallon of Termidor was used at each residence. In the IPM route, the amount of Talstar G applied was reduced by 63%. The EcoExempt IC2 sprays were substituted for the granular applications of bifenthrin.

During the season, technicians encountered problems with spider control and lawn burning from the EcoExempt IC-2 sprays. The sprays were replaced mid season with Eco-PCO WPX on the second test route. The call back numbers for the IPM Route (Table 6), when a client calls for additional free service covered under their contract, was in line with the CR route. This indicates that even though the pyrethroid usage was greatly reduced, the pest ant control effectiveness was at least as good as the CR treatment in 2008.

The chemical costs per route were about the same between the conventional and IPM routes. Customers were very satisfied with both the CR (89.9%) and IPM (91.1%) treatments (Table 8).

Table 6. Summary of the residential accounts on the Conventional and IPM routes treated by Lloyd Pest Control in 2009.

<i>Conventional Route</i>							
Rte.*	Month	CB	Reg	Avg. min/stop	Ants	Spiders	Others
3	April	19	96	30.9	103	2	15
	May	15	91	27.2	95	0	16
	June	15	73	32.6	82	1	7
	July	22	76	25.0	85	4	6
	August	20	92	27.8	95	3	14
	September	10	86	27.7	92	1	5
	October	12	131	26.7	121	16	1
	November	7	138	24.9	124	12	3
	total	112	692	28.2	699	50	71
	% of stops	13.9			86.9	6.2	8.8
<i>IPM Route</i>							
23	April	17	78	31.5	78	0	14
	May	16	69	25.5	75	0	11
	June	14	78	26.4	85	1	9
	July	23	65	28.5	76	13	5
	August	16	80	29.9	82	6	15
	September	10	99	30.0	102	3	12
	October	7	98	26.0	91	12	1
	November	9	125	27.7	110	15	4
	total	120	783	27.8	797	39	67
	% of stops	13.3			88.3	4.3	7.4

- CB = call backs, Reg = regularly scheduled treatments

Table 7. Insecticide treatments applied on Conventional and IPM routes treated by Lloyd Pest Control in 2009.

Conventional Route							
	<i>Insecticides Applied*</i>						
Month	1	2	3	4	5	12	14
April	92	580	42	1	0	34	3
May	129	345	0	543	0	34	5
June	82	620	8	0	0	64	30
July	90	555	0	0	0	52	5
Aug.	91	682	5	0	0	230	78
Sept.	84	721	0	0	0	56	37
Oct.	12	1241	0	0	0	84	0
Nov.	1	1501	0	0	0	132	0
total	581	6245	55	544	0	686	158
IPM Route							
April	92	0	0	87	856	5	0
May	125	215	0	459	0	26	0
June	115	0	0	989	0	17	0
July	97	465	0	486	0	13	0
Aug.	119	1047	0	0	0	30	0
Sept.	142	1105	0	0	0	4	12
Oct.	96	1138	0	0	0	20	0
Nov.	0	1484	0	0	0	136	0
total	786	5454	0	2021	856	251	12

*

- 1 Termidor SC (fipronil, 0.06%), gal
- 2 EcoPCO WP-X 16 oz/50-gal power sprayer, gal
- 3 EcoPCO WP-X 12 tab (2oz)/ 4-gal back pack sprayer, gal
- 4 EcoExempt IC2 12oz/4-gal back pack sprayer, (gal)
- 5 EcoExempt IC2 25oz/50-gal power sprayer, gal
- 12 Talstar EZ granules, [ants outdoors], oz.
- 14 Maxforce Killer Ant bait, [ants indoors], oz.

Table 8. Post season telephone customer surveys to three questions from 2008 and 2009.

Year	Route	Question	Yes	No
2008	Conventional	Were you satisfied with your ant control service in 2008 compared with 2007?	52	0
	IPM		98	3
2009	Conventional		53	6
	IPM		51	5

Year		Question	None	Light	moderate	heavy
2008	Conventional	How would you rate your 2008 summer ant problem Outdoors?	34	16	2	0
	IPM		45	40	15	1
2009	Conventional		26	24	4	5
	IPM		16	24	8	4

Year		Question	None	Light	moderate	heavy
2008	Conventional	How would you rate your 2008 summer ant problem Indoors?	50	1	1	0
	IPM		8937	10	2	0
2009	Conventional		39	14	6	0
	IPM		44	7	15	0

Western Exterminator Company

Two residential routes were selected in Orange County, both near the coast. These were chosen because Western Exterminator Company wanted to be able to incorporate the IPM program at their other branch offices, emphasizing the use of plant oils rather than pyrethroids. To make the treatments as realistic as possible, the technician on the IPM route (reduced pyrethroid applications) was told to emphasize the use of plant oils, but the actual choice of materials was left up to the technician (Appendix IV).

2008

Argentine ants were the most significant problem on both accounts (Table 9). Technicians reported 74.8% and 92% of the accounts with ants on the CR and IPM routes, respectfully. The technicians spent an average of 17.7 and 15.5 minutes per stop on the CR and IPM routes, respectfully. The number of re-treatments was very low on each route.

Approximately 1.3 lbs pyrethroid (active ingredient, 578 g) was sprayed on the CR route (Table 10) compared with 0.43 lbs (AI, 194 g) on the IPM route. This represented a 66.4% reduction in the amount of pyrethroid sprayed to control ants. The deltamethrin sprays were replaced with pyrethrin and plant oil sprays on the IPM route.

Although only a small number of customers responded, ratings were positive on both routes (Table 11). The data support the proposition that a 50% plus reduction in pyrethroids can be accomplished without lowering customer's satisfaction. The technician on the IPM route reported that the plant products worked, although he did on 38 occasions use a pyrethroid. It was also encouraging that the technician on the IPM route did not overly rely on Termidor to make up for any perceived lack of residual activity of the plant oils. The IPM route averaged 0.07 lbs. of Termidor (AI) per 100 stops compared with 0.14 lbs. per 100 stops on the CR route.

2009

Again, Argentine ants were the most significant problem on the CR and IPM routes, 66.6% and 58.8% respectfully (Table 12). The number of residences re-treated was 108 (5.9%) and 92 (5.7%) for the CR and IPM routes, respectfully. This was up slightly from 2008.

On the IPM route, the technician was told to reduce the amount of Termidor sprays applied. The IPM route averaged 0.02 lbs. of Termidor (AI) per 100 stops where as the CR route averaged 0.11 lbs. per 100 stops (Table 13). Unfortunately, when the IPM route technician received calls from his customers about ants, the technician used more Tempo Ultra (cyfluthrin) rather than using more Termidor. The CR route averaged 0.22 lbs of pyrethroid (AI) per 100 stops where as the IPM route averaged 0.16 lbs. per 100 stops, still a 27% reduction when compared to the 2009 CR route and a 77% reduction from the 2008 CR route.

In January 2010, Western Exterminator Company switched all their day routes over to this IPM approach where the emphasis is on plant oils and other low impact products such as insect baits. This approach is referred as “Reduced Impact Pest Control.”

Table 9. Summary of the Western Exterminator Company routes for 2008.

<i>Conventional Route*</i>							
Rte.	Month	CB	Reg	Avg. Min/stop	Ants	Spiders	Others
920	April	0	161	14.8	118	9	12
	May	0	155	14.4	118	6	17
	June	0	166	15.7	124	6	14
	July	3	150	14.1	117	5	7
	August	7	161	19.1	122	9	8
	September	2	150	24.2	113	17	6
	October	0	183	21.6	139	7	12
	total	12	1126	17.7	851	59	76
	% of stops	1.1			74.8	5.2	6.7
<i>IPM Route*</i>							
932	April	0	192	12.3	183	2	6
	May	0	174	16.8	163	3	3
	June	0	193	16.1	182	1	7
	July	2	216	15.8	185	6	6
	August	3	230	17.5	214	5	5
	September	3	200	15.4	186	5	9
	October	0	217	14.3	203	6	3
	total	8	1422	15.5	1316	28	39
	% of stops	0.6			92.0	2.0	2.7

* CB = call backs, Reg = regularly scheduled treatments.

Table 10. Insecticide treatments applied on Conventional and IPM routes by Western Exterminator Company in 2008.

Conventional Route 920												
	<i>Insecticides Applied*</i>											
Month	4	5	7	8	10	12	13	16	20	24	27	28
April	2	125	2	34	0	0	1	0	0	0	0	0
May	1	1	1	8	0	0	81	0	0	0	0	0
June	0	13	0	45	0	0	56	0	0	0	0	0
July	0	98	9	37	0	0	22	0	0	0	0	0
Aug.	3	5	1	2	0	0	112	0	0	0	0	0
Sept.	1	54	8	27	0	0	41	0	0	0	0	0
Oct.	0	39	6	69	0	0	24	0	0	0	0	0
total	7	335	27	222	0	0	337	0	0	0	0	0
IPM Route 932												
April	0	0	2	0	0	0	50	54	0	0	1	0
May	0	0	2	0	0	0	0	62	0	0	0	0
June	0	0	10	0	0	0	20	77	0	0	0	0
July	0	0	10	0	8	0	29	50	4	0	0	20
Aug.	6	0	6	0	32	23	35	29	0	0	0	0
Sept.	1	0	0	0	22	6	6	68	0	0	3	65
Oct.	0	0	0	0	0	26	5	24	129	2	96	550
total	7	0	37	0	62	65	145	364	133	2	100	635

*

4 = Dragnet SFR Termiticide/insecticide (permethrin, 3.2 EC), oz.

5 = Suspend SC (deltamethrin, 0.42 SC), oz.

7 = Niban Granular bait (5% orthoboric acid), oz.

8 = Deltaguard G (0.1% deltamethrin), oz.

10 = Cy-Kick CS (cyfluthrin, 0.5 ME), oz.

12 = Niban FG Granular Bait (5% orthoboric acid), oz.

13 = Termidor SC Termiticide/Insecticide (fipronil, 0.8SC), oz.

16 = PyGanic Pro (5% pyrethrins),

20 = EcoPCO WP X (3% 2-phenethyl propionate, 0.05% pyrethrins, 5.0% thyme oil), grams

24 = Talstar Professional (bifenthrin, 0.67 SC), oz.

27 = Eco Exempt G (2.9% eugenol, 0.06% thyme oil), oz.

28 = Eco Exempt IC2 (10% rosemary oil, 2% peppermint oil), oz.

Table 11. Western Exterminator Company post season telephone customer surveys to three questions from 2008 and 2009.

Year	Route	Question	Yes	No
2008	Conventional	Were you satisfied with your ant control service in 2008 compared with 2007?	40	0
	IPM		40	0
2009	Conventional		57	1
	IPM		60	2

Year		Question	None	Light	moderate	heavy
2008	Conventional	How would you rate your 2008 summer ant problem Outdoors?	23	15	2	0
	IPM		20	18	2	0
2009	Conventional		47	7	4	0
	IPM		44	13	5	0

Year		Question	None	Light	moderate	heavy
2008	Conventional	How would you rate your 2008 summer ant problem Indoors?	35	5	0	0
	IPM		30	8	0	2
2009	Conventional		51	5	2	0
	IPM		55	6	1	0

Table 12. Summary of the Western Exterminator Company routes for 2009.

<i>Conventional Route</i>						
Rte.	Month	CB*	Reg	Ants	Spiders	Others
930	May	21	265	193	7	36
	June	12	242	174	9	30
	July	22	261	197	8	42
	August	13	216	149	8	31
	September	21	266	205	13	35
	October	8	258	164	8	27
	November	11	230	148	10	40
	total	108	1738	1230	63	241
	% of stops	5.9		66.6	3.6	13.9
<i>IPM Route</i>						
932	May	6	196	129	6	24
	June	18	224	154	6	28
	July	16	230	150	6	30
	August	23	226	152	6	35
	September	17	215	138	8	27
	October	8	245	124	9	36
	November	4	189	103	9	30
	total	92	1525	950	50	210
	% of stops	5.7		58.8	3.1	13.0

* CB = call backs, Reg = regularly scheduled treatments

Table 13. Insecticide treatments applied at Conventional and IPM routes by Western Exterminator Company in 2009.

Conventional Route 930														
	<i>Insecticides Applied *</i>													
Month	5	72	75	101	137	140	144	153	180	181	197	202	940	946
May	0	2	1	110	1	16	61	0	2024	0	0	90	16	180
June	9	0	1	154	2	0	87	0	331	0	225	0	23	17
July	0	38	0	80	9	0	102	0	1805	0	6	0	11	0
Aug.	0	21	0	14	8	0	2	0	749	123	0	0	18	174
Sept.	0	28	19	38	85	0	11	112	156	339	44	0	6	1
Oct.	0	18	11	0	44	0	29	22	330	166	35	0	42	0
Nov.	0	8	43	0	4	0	45	208	678	0	186	0	16	0
total	9	115	75	396	153	16	337	342	6073	628	496	90	132	372
IPM Route 932														
May	0	0	0	0	2	151	4	0	1942	1	1	114	66	178
June	0	0	0	0	5	84	10	0	2056	0	10	140	45	185
July	0	1	0	0	14	0	8	0	1741	0	9	120	39	258
Aug.	0	14	53	0	64	0	3	307	1380	288	11	280	15	120
Sept.	0	0	16	0	0	0	1	3651	0	3661	6	220	6	0
Oct.	0	0	0	0	0	0	32	2389	1964	2300	13	0	25	146
Nov.	0	0	0	0	0	0	0	343	5625	281	13	0	23	726
total	0	15	69	0	85	235	58	6690	14708	6531	53	874	219	1613

*

5 = Cynoff EC insecticide (cypermethrin, 2EC), oz.

72 = Dagnet SFR Termiticide/insecticide (permethrin, 3.2 EC), oz.

75 = Suspend SC (deltamethrin, 0.42 SC), oz.

101 = Niban Granular bait (5% orthoboric acid), oz.

137 = Cy-Kick CS (cyfluthrin, 0.5 ME), oz.

140 = Niban FG Granular Bait (5% orthoboric acid), oz.

144 = Termidor SC Termiticide/Insecticide (fipronil, 0.8SC), oz.

153 = Tempo SC Ultra (cyfluthrin, 1SC), ml.

180 = EcoPCO WPX (3% 2-phenethyl propionate, 0.05% pyrethrins, 5.0% thyme oil), grams

181 = Premise 2 (imidacloprid, 2SC), oz.

197 = Mother Earth Granular Scatter Bait (5.0% boric acid), lb.

202 = Advion Ant Gel bait (0.05% indoxacarb), grams

940 = Eco Exempt G (2.9% eugenol, 0.06% thyme oil), oz.

946 = Eco Exempt IC2 (10% rosemary oil, 2% peppermint oil), oz.

Clark Pest Control

Route Dynamics.- Clark Pest Control conducted their part of the PMA study in the Greater Sacramento Metro area in the city of Rancho Cordova. The two residential routes were located in areas close to the American River with some properties sharing a property line with the American River Parkway. The neighborhood is approximately 15-20 years old with established landscape and mature trees. This is a relatively affluent area with most of residents having a middle class income.

2009

The technician serviced about 148 accounts per month on the Conventional Route (CR) and about 145 accounts on the IPM Route (Table 14, Appendix IV). These numbers are typical for residential routes in these locations and demographics. Spiders were the most frequently reported pest (89.9% CR and 86.6% IPM) and ants were the second most common pest (29.8% CR and 30.8% IPM). The technician spent 28.8 min/stop on the CR route and 31.5 min/stop on the IPM route. Over 8 months, there were 39 (3.2%) residences retreated in the CR route and 55 (4.5%) in the IPM route.

The CR route was treated with Cy-Kick (cyfluthrin) applied from a truck mounted applicator (4,058 gals, 2,458 g AI) and from back pack sprayers (211 gals., 399 g AI, Table 15). This route was also treated with permethrin applied with a 1-gallon compressed sprayer (149 gals, 1,691 g AI). The technician applied 223 gals. of fipronil (506 g AI). In addition, 281 lbs of 5.0% boric acid bait was scattered around the structures.

The IPM route utilized the product EcoPCO WP-X with a truck mounted applicator (518 gals., botanically based product) and 1-gallon compressed air applicator (697 gals.), during the summer. Permethrin was applied in a 1-gallon compressed air sprayer around the eaves and other

parts of the structure (154 gals., 1,749 g AI). Fipronil was applied for ants on an as needed basis (168 gals. 382 g AI). In addition, 1,118 lbs of 5.0% boric acid bait was scattered around the structures.

There was a 61.5% reduction in the total amount of pyrethroids applied in the IPM route. The use of cyfluthrin was eliminated in the IPM route.

Clark Pest Control management found both of these routes to be comparable with all critical factors: time, material usage, call back/stop rates, customer satisfaction, technician satisfaction, etc. This is a direction that the company is moving on a large scale and has used this grant to demonstrate that this shift can happen with the appropriate amount of time and training.

Customer Satisfaction Response.- After some analysis and thought, the management thought a customer survey would not provide the information that was originally sought. The proposed survey was looking for the customer's satisfaction isolated to the ant control strategies of their service provided by Clark Pest Control. Clark Pest Control does not segment their services into various pests and does not wish the customer to as well.

The IPM route had been performing this service for the past two plus years so comparing data against the previous year would not yield the required information. When the call back numbers on the CR and IPM Route were compared, the conventional route was a little bit higher but still within an acceptable range. Overall, the level of customer satisfaction with both services and our technicians were comparable and both received high ratings

Table 14. Summary of the Clark Pest Control routes 2009.

<i>Conventional Route</i>							
Month	CB*	Reg	Avg. min	Ants	Roaches	Spiders	Others
April	8	133	33.4	88	0	91	96
May	0	132	32.1	75	2	105	73
June	12	159	32.3	19	7	169	149
July	13	122	35.1	3	0	132	114
August	5	116	22.4	3	0	113	76
September	0	169	25.0	0	0	168	139
October	1	179	24.6	38	1	179	158
November	0	175	25.7	139	0	143	110
total	39	1185	28.8	365	10	1100	915
% of stops	3.2			29.8	0.8	89.9	74.8
<i>IPM Route</i>							
April	6	162	35.9	132	0	114	143
May	0	126	31.2	110	15	124	106
June	16	194	30.3	19	0	152	128
July	26	166	24.1	14	0	170	143
August	7	104	31.4	3	0	109	87
September	0	133	32.9	1	0	127	131
October	0	150	33.6	1	0	148	150
November	0	123	32.6	94	0	106	116
total	55	1158	31.5	374	15	1050	1004
	4.5			30.8	1.2	86.6	82.8

- CB = call back, Reg = regularly scheduled treatments.

Table 15. Insecticides applied on Conventional and IPM routes by Clark's Pest Control (CPC) in 2009.

Conventional Route										
	<i>Insecticides Applied*</i>									
Month	1	2	3	4	5	6	7	8	9	13
April	320	40	3	18	0	3	44	0	0	104
May	508	27	0	21	0	0	48	0	8	70
June	638	64	0	21	0	0	14	8	8	16
July	637	9	0	23	0	0	11	32	10	0
August	438	2	0	12	0	0	2	13	0	0
September	698	4	0	18	0	0	1	0	0	2
October	531	22	0	20	0	0	22	0	0	27
November	288	43	0	16	0	0	81	0	0	62
Total	4058	211	3	149	0	3	223	53	26	281
IPM Route										
April	0	0	0	23	0	30	60	1	0	151
May	0	0	1	17	0	33	47	0	0	104
June	0	0	0	24	309	63	11	0	0	170
July	0	0	0	18	112	104	3	0	0	135
August	0	0	0	15	97	77	1	4	0	82
September	0	0	0	18	0	158	0	10	0	168
October	0	0	0	26	0	158	0	0	0	170
November	0	0	0	13	0	74	46	0	0	138
Total	0	0	1	154	518	697	168	15	0	1118

*

1 = 0.016% CyKick CS (cyfluthrin, 0.5 ME), gals

2 = 0.05% Cy-Kick CS (cyfluthrin, 0.5 ME), gals

3 = 0.024% Tengard SFR (permethrin, 3.2 EC), gals

4 = 0.3% Tengard SFR (permethrin, 3.2 EC), gals

5 = EcoPCO WP-X 0.008% (3% 2-phenethyl propionate, 0.05% pyrethrins, 5.0% thyme oil), power sprayer, gals

6 = EcoPCO WP-X 0.125% (3% 2-phenethyl propionate, 0.05% pyrethrins, 5.0% thyme oil), 1-gal hand sprayer, gals

7 = 0.06% Termidor (fipronil, 0.8SC), gals

8 = Maxforce Killer Ant bait (0.001% fipronil), grams

9 = Advion Ant Gel (0.05 % indoxacarb), grams

13 = Mother Earth Scatter Bait (5.0% boric acid), lbs

Ant Surveys

Ants that were collected by PMPs at various localities were identified (Table 16). Even though it was a very limited survey, it is evident that other species besides the Argentine ant are a pest problem in the greater Sacramento area.

An intensive survey of the urban pest species is warranted in urban areas of California, especially the Bay and Central Valley Area.

Table 16. Species of ants collected at various localities.

Region	City	Species	Company
Central CA	Denair (near Modesto)	Pyramid ant (<i>P. bicolor</i>)	Clark's
Central CA	Denair (near Modesto)	Thief ant (<i>S. molesta</i>)	Clark's
Central CA	Modesto	Odorous house ant	Clark's
Central CA	Modesto (near Stockton)	Argentine ant	Clark's
Central CA	Morgan Hill (near San Jose)	Argentine ant	APro
Central CA	Morgan Hill (near San Jose)	Argentine ant	APro
Central CA	Rancho Cordova (near Sacramento)	Pavement ant	?
Central CA	Rancho Cordova (near Sacramento)	Odorous house ant	Clark's
Central CA	Roseville (near Sacramento)	Little black ant	Clark's
Central CA	Roseville (near Sacramento)	Pavement ant	Clark's
Central CA	Turlock (near Modesto)	Argentine ant	Clark's
Central CA	Turlock (near Modesto)	Pavement ant	Clark's
Central CA	Turlock (near Modesto)	Pavement ant	Clark's
Central CA	Turlock (near Modesto)	<i>Cardiocondyla</i>	Clark's
Central CA	Walnut Creek (near Berkeley)	Pavement ant	?
Southern CA	Hawthorne (near LA)	Argentine ant	?
Southern CA	Hawthorne (near LA)	Argentine ant	?
Southern CA	Torrance (near LA)	Argentine ant	?

Summary

The PMPs were able to successfully reduce the amount of pyrethroids applied to control ants by at least 50%. The reductions were achieved by a number of different means depending upon the company and its operations. Eliminating every month applications and beginning every-other-month or quarterly applications helped reduce applications by 50-60%. Another strategy was to replace the pyrethroid applications with alternative sprays and baits. Both of these approaches, however, were dependent upon the use of fipronil sprays early in the ant season and late summer applications when necessary.

The reductions in the applications of pyrethroids and the alternative strategies employed were well received by the customers. The technicians on the IPM routes did not spend more time servicing accounts. In some cases, the IPM routes had slightly higher insecticide costs than the Conventional routes. However, these were not significant. In fact several of the PMPs have adopted these IPM routes throughout the company.

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APPENDIX I

Team Members	Affiliation	Role
Michael Rust	UC Riverside	Principal Investigator
Donald Reiersen	UC Riverside	Coordinator
John Klotz	UC Riverside, CE Specialist	Co-PI
John Kabashima	UC County Advisor	Co-PI
Cheryl Wilen	UC Area IPM Advisor	Co-PI
Les Greenberg	UC Riverside Specialist	Website, data management
Daren Haver	UC Water Quality Advisor	Pesticide and Water Runoff
Brain Cabrera	Santa Barbara Co., Entomol. Ag. Commissioner's Office	Outreach consumers website
Mark Robertson	California Department of Pesticide Regulation	
Pat Copps	Orkin Pest Control	Industry representative
Herb Field	Lloyd Pest Control	Industry representative
Keith Willingham	Western Exterminator Co.	Industry representative
Team Partners	Affiliation	Role
Charles Payton	A-Pro Pest Control	Industry representative
Darren Van Steenwyk	Clark Pest Control	Industry representative
Corky Miser	Corky's Pest Control	Industry representative
Sylvia Kenmuir	Target Specialty Products	Training, education
David Cox	Syngenta Crop Protection	Manufacturer
Naresh Duggal	County of Santa Clara	Outreach, County Gov.

APPENDIX II

Objectives and Tasks - Urban Pest Ant Management, 2008-2010

Objective	Tasks, Milestones or Deliverables/Outcomes (related to objectives)	Begin	End
Grant review and organization	Team Meeting 1	Jan 08	Jan 08
Conference presentation	Oral presentation and display booth at U.C. Entomology Conference	Mar 08	Mar 08
Implement IPM	Team Meeting 2 - select residences, implement IPM strategies	April 08	April 08
Evaluate PMA acceptance	Team Meeting 2 - design survey methodology and cards	April 08	April 08
Develop a web-based site	Team Meeting 2 - preliminary ideas for PMA pest ant website	April 08	April 08
Evaluate IPM program	Produce, distribute and retrieve pre-IPM survey cards	May 08	May 08
Seminars	Team Partner Meeting 1 - how PMA info can be disseminated at seminars in fall	May 08	May 08
Website development	Team Partner Meeting 1 - government and industry input re: refining website	May 08	May 08

Workshop	Team Member PMPs participating in the project	May 08	July 08
Website	Unveil interactive urban pest ant website, with links	June 08	June 08
Evaluate IPM program	Team Meeting 3 - review survey card process used in May, refine as needed	July 08	July 08
2008 Semi-annual Report	Prepare and review report beforehand, finalize at Team Meeting 3	July 08	Aug 08
Evaluate IPM program	Team Meeting 4 - produce, distribute and retrieve post-IPM survey cards	Oct 08	Nov 08
Reduce pesticides	Team Meeting 4 - gather Pesticide Use Reports for selected residences in study	Oct 08	Nov 08
Seminars	Oral presentations and display booth at industry fall seminars	Oct 08	Nov 08
Implement IPM	Team Meeting 5 - review 2008 IPM methods and develop strategies for 2009	Jan 09	Jan 09
2008 Annual Report	Prepare and review before, finalize at Team Meeting 5	Dec 08	Jan 09
Conference presentation	Oral presentation and display booth at U.C. Entomology Conference	Mar 09	Mar 09
Implement IPM	Solicit and train Team Affiliates regarding ant IPM strategies; use training module	Mar 09	Jun 09
Implement IPM	Team Meeting 6 - evaluate progress of PMA, prepare final list of IPM strategies	April 09	May 09
Workshop	Team Member and Team Affiliate PMPs participating in the program	April 09	July 09
Implement IPM	Team Affiliates implement PMA pest ant IPM strategies; report their evaluations	Jun 09	Oct 09
Implement IPM	Team Partner Meeting 3 - how Partners and Affiliates can expand their base	May 09	Jun 09
Website	Team Partner Meeting 3 - evaluate website usefulness	May 09	Jun 09

Objective	Tasks, Milestones or Deliverables/Outcomes (related to objectives)	Begin	End
Seminars	Team Partner Meeting 3 - arrange for Team to make presentations in fall	May 09	Nov 09
Seminars	Oral presentation and display booth at PCOC statewide Convention	June 09	June 09
2009 Semi-annual Report	Prepare and review report before, finalize at Team Meeting 7	June 09	July 09
Training	Make available on-line or CD ant IPM training module to PMPs	June 09	May 10
Seminars	Oral presentations and display at industry fall continuing ed seminars	Oct 09	Nov 09
Reduce pesticides	Team Meeting 8 - gather Pesticide Use Reports for selected residences in study	Oct 09	Nov 09
Evaluate IPM program	Team Meeting 8 - produce, distribute and retrieve 2-year post-IPM survey cards	Oct 09	Dec 09

APPENDIX III

San Jose and Riverside Conference Program

University of California, Riverside
 Department of Entomology
 900 University Ave.
 Riverside, CA 92521

Address correction requested

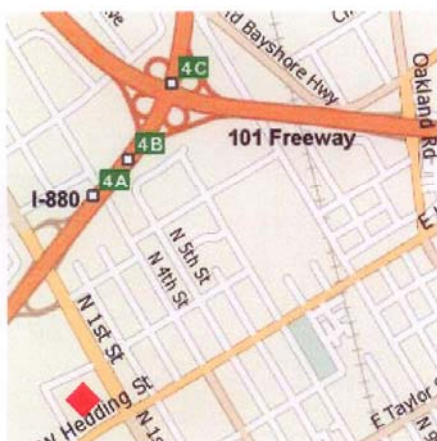
Web site:
<http://groups.ucanr.org/UrbanAnt/>
<http://insects.ucr.edu/events/>

Department of Entomology
 University of California, Riverside



Low Impact Strategies for Ant Control: An Industry -DPR Alliance Conference

Santa Clara County-Isaac Newton Senter
 70 West Hedding St.
 San Jose, CA 95110
 November 10, 2009



Directions to Isaac Newton Senter

From East I-880 Freeway: Take the I-880 Freeway West to N 1st St. Exit at N 1st St and turn left. Turn right at W. Hedding Street. Park at Garage 171, W. Hedding Street. Walk across the street towards Santa Clara County Government Center 70, W. Hedding Street. Isaac Newton Senter is inside the County Government Center.

From West I-880 Freeway: Take the I-880 Freeway East. Exit at N 1st St. and turn right. Turn right at W. Hedding Street. Park at Garage 171, W. Hedding Street. Walk across the street towards Santa Clara County Government Center 70, W. Hedding Street. Isaac Newton Senter is inside the County Government Center.

Parking Garage: 171 W. Hedding Street, San Jose, CA 95110; A fee is charged per day.

Purpose

This day-long conference is for professionals in the structural pest control industry. The conference is designed for those supervisors, managers, directors, and others that design and implement ant IPM programs in their companies. Current applied information and practical experience from industry leaders will be covered.

Topics

A range of topics for the decision maker and users will be addressed. In a casual classroom setting, hear about potential regulatory and pesticide water runoff issues that affect you. Listen to the latest research and low-impact approaches that can help you control urban pests. Join in and participate in the panel discussion.

Educational Credits

Please check our website after October 1, 2009, for credits being offered by the California Structural Pest Control Board, the California Department of Pesticide Regulation.

Our websites are:
<http://groups.ucanr.org/UrbanAnt/>
<http://insects.ucr.edu/events/>

You must sign in at the credentials table with your license number in order to receive credits. A test will be given at the end of the conference for CEU credits.

Tuesday, November 10, 2009

7:45 Registration and Coffee
 8:30 Welcome: Donald Reterson, UCR
 8:40 History and Goals of the ANT PMA: Dr. Michael Rust

Why-what the pesticide runoff issue is all about

8:55 Dr. Mark Robertson, CDPR: "DPR and its clean water mandate, and why a 50% reduction in pyrethroid use"
 9:25 Dr. Nam Singhasemanon, CDPR: "Pesticides in Urban Runoff and Waterways"
 9:50 Dr. Cheryl Wilen, UCR IPM: "PMP and homeowner use of pyrethroids"
 10:10 Break
 10:40 Dr. Darren Haver, UCR Coop. Extension: "The good, bad, and the ugly: urban irrigation affects pesticide runoff"
 11:00 Dr. John Klotz, UCR Riverside: "Ant control field studies: baiting and targeted treatments"
 11:25 Dr. Les Greenberg, UCR Riverside: "Residential water runoff studies"
 12:00 Lunch

What PMPs can do- and how

1:05 Dr. Michael Rust, UCR Riverside: "Organizational design of the PMA, outdoor pests and customer surveys, and data supporting reduced pyrethroid approach."

1:15 Herb Field, Lloyd Pest Control

1:30 Pat Copps, Orkin Exterminating Company

1:45 Keith Willingham, Western Exterminator Company

2:00 Darren Van Steenwyk, Clark Pest Control

2:15 Break

2:45 Corky Mizer, Corky's Pest Control

3:00 Charles Rayton, A-Pro Pest Control

3:15 Panel discussion, Donald Reterson

3:45 Closing Comments
 Test for CEU credits

Branch 2 Technical – 1.0 hr
IPM – 2.0 hrs
Rules & Regs. – 3.0 hrs

Registration

\$40.00* per person postmarked on or before October 30, 2009 (includes lunch)

*\$45 per person after October 30 and at the door.
No refunds will be issued.

Make checks payable to: UC Regents
 (No credit cards accepted)

Mail this form with check before October 30, 2009, to:
 Low Impact Strategies for Ant Control

Naresh Dugal
 Office of the County Executive
 County of Santa Clara, East Wing, 11th Floor
 70, W. Hedding Street
 San Jose, CA 95110

For further information call:
 Attention: Jody Venturina
 (951) 827-5805
 Fax: (951) 827-3086

One form per person. Copy if more are needed.

Name (print clearly)

Organization/Company

Phone No.

Licenses Held (type & number)

e-mail address (please print clearly)

Street Address

City/State/Zip

Special disability services are available to attendees. Requests must be received one month before the meeting date by calling (951) 827-5294.

If you have special dietary needs, information MUST be received no later than October 30, 2009.

Appendix IV

Conventional and IPM Routes from Team Members

Orkin 2008	
Orkin 2009.....	
Clark Pest Control 2009.....	
Western Exterminator 2008.....	
Lloyd Pest Control 2008.....	
Lloyd Pest Control 2009.....	
A-Pro Pest Control, Inc.	
Corky's Pest Control 2009.....	

**Proposed Orkin Treatment Protocol (April '08 – April '09)
Every Other Month (EOM) most common service***

Route “A” Conventional Application**

1st Month- April/May

Inspection, Talstar Pro/Cykick CS

2nd Month- June/July

Inspection, Termidor Option? /Talstar Pro/Cykick CS

3rd Month-August/September

Inspection, Termidor Option? /Talstar Pro/CyKick CS

4th Month- October/November

Inspection, Talstar Pro/Cykick CS

5th Month- December/January

Inspection, Talstar Pro/Cykick CS (Trail/Spot treatments)

6th Month- February/March

Inspection, Talstar Pro/Cykick CS (Trail/Spot treatments)

Route “B”- IPM PMA Protocol**

1st Month April/May

Inspection, Trail Treatment, Spot Applications: Termidor?/Talstar Pro/Cykick CS.

2nd Month June/July

Inspection, Termidor Treatment per the following restrictions:

3rd Month August/September

Inspection, Trail Treatment, Spot Applications: Talstar Pro/Cykick CS.

4th Month October/November

Inspection, Trail Treatment, Spot Applications: Talstar Pro/Cykick CS.

5th & 6th Months are the same as the 4th Month

* Adjustments required for quarterly or monthly customers

** All treatments must be 10 ft away from curb (No spray zone). No treatments on or within 1 ft of driveway, sidewalks or other hard surfaces connected to the street.

All inside treatments (A or B route)- One or more of the following are used: Phantom, Cykick Aerosol, PT 565+, Eco Smart ACU and Gel Baits.

Termidor applications are generally made only once per year.

Clark Pest Control PMA Treatment Protocol for 2009

Customer Service on an EOM (Every Other Month) interval

Conventional Route

April/May: Cy-Kick/Tengard/Termidor

June/July: Cy-Kick/Tengard/Termidor

August/September: Cy-Kick/Tengard/Termidor

October/November: Cy-Kick/Tengard/Termidor

December/January: Mother Earth Scatter Bait

February/March: Mother Earth Scatter bait

IPM PMA Route

April/May: WP-X/Tengard/Termidor

Inspect, use power sprayer to treat the foliage and the edges of concrete.

June/July: WP-X/Tengard/Termidor

Inspect, use power sprayer to treat the foliage and the edges of concrete.

August/September: WP-X/Tengard/Termidor

Inspect, use power sprayer to treat the foliage and the edges of concrete.

October/November: WP-X/Tengard/Termidor

Inspect, use power sprayer to treat the foliage and the edges of concrete.

December/January: Mother Earth Scatter Bait

Treat areas of ground cover and dense foliage with granules.

February/March: Mother Earth Scatter bait

Treat areas of ground cover and dense foliage with granules.

- As there is a modified Termidor label that will only allow us to treat the perimeter of the building along the foundation, this use pattern will be applied for both routes. This product will be used on accounts with moderate to heavy ant activity and initial services. The average volume applied is to be approximately 0.5 finished gal per account.
- In the power sprayer, there is WP-X and Tengard.
- In the 1 gal sprayer, there is only Tengard used treat limited areas and eves for spiders.

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FAX (714) 517-1199 www.west-ext.com

Western's Protocol for Pest Ant PMA Project

Protocol for Conventional or Traditional Route

We will use one of the routes from the Service Center. The technical will be using all the tools in his tool box. He will use any chemical listed on Western Approval list.

Protocol for Reduced Risk IPM Route:

April:

- Spider Web removal and Inspection
- If there is ant activity: Use Termidor (limit to ca. 1 gal/home; apply with hand compression or backpack sprayer)
- If **no ant activity**: Use Eco PCO WP.X or EcoExempt IC2 or Microcare CS

May:

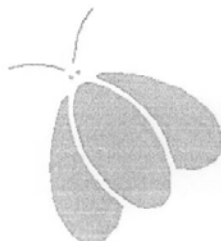
- Spider Web removal and Inspection
 - If Termidor was not used in April, USE Termidor (limit to ca. 1 gal/home; apply with hand compression or backpack sprayer)
 - If Termidor was used in April, then Eco PCO WP.X or EcoExempt IC2 or Microcare CS
- FIRST TERMIDOR application will be made in either in APRIL or May.**

June, July, & August:

- Spider Web removal and Inspection
- High Ant activity: Premise 2 (Outside), (Phantom (Inside))
- Low ant activity or maintenance: Eco PCO WP.X or EcoExempt IC2 or Microcare CS

September:

- Spider Web removal and Inspection
- If there is ant activity: Use Termidor



A-PRO Pest Control, Inc.
Integrated Pest Management Service

2009 PMA Treatment Protocol

Every Other Month Service:

Conventional Route

April/May: Cy-Kick , Tengard, Suspend, Termidor

June/July: Cy-Kick, Tengard, Suspend, Termidor

August/September: Cy-Kick, Tengard, Suspend, Termidor

October/November: Cy-Kick, Tengard, Suspend, Termidor

December/January: Delta Gard, Talstar, Advanced Granules

February/March: Delta Gard, Talstar, Advanced Granules

IPM PMA Route

April/May: EcoPCO WP-X, Tengard, Termidor

Inspect, back pack treatment at foundation only. No treatments around sidewalks or driveways.

June/July: EcoPCO WP-X, Tengard, Termidor

Inspect, back pack treatment at foundation only. No treatments around sidewalks or driveways.

August/September: EcoPCO WP-X, Tengard, Termidor

Inspect, back pack treatment at foundation only. No treatments around sidewalks or driveways.

October/November: EcoPCO WP-X, Tengard, Termidor

Inspect, back pack treatment at foundation only. No treatments around sidewalks or driveways.

December/January: Advanced Granules, Mother Earth Scatter Bait

Treat areas of ground cover and dense foliage with granules.

February/March: Advanced Granules, Mother Earth Scatter bait

Treat areas of ground cover and dense foliage with granules.

Corky's Pest Control, San Marcos

Corky's Cell 760-801-0719

How did we choose our IPM routes?

We specifically chose routes in different climatic areas to fully test the feasibility of this IPM program.

Our five routes include the following areas: Inland and Coastal San Diego, Inland and Coastal Los Angeles, and Inland San Bernardino.

New IPM Route without Pyrethroids

We will be using the "new label" Termidor applied only with a backpack around the foundation; this application will not exceed 1 ft. up or 1 ft. out. From May-July we will be using ECO Exempt Granules in areas around the outside property perimeter to repel crawling insects from our customer's properties as a regular treatment. This treatment will be repeated any other time of the year we deem necessary. We will use our sub-surface probe to probe out any ant colonies found while inspecting our customers' properties.

We will often use Excite R either as a kicker in ECO IC or ECO WPX; it will sometimes be used alone depending on staining issues. We will use ECO Exempt dust and other botanical insecticides in various forms. We will always inspect and/or treat as necessary any areas of concern or infestation. We will not use any insect baits.

March 23rd /May 2nd

- ECO IC – Inspect and/or treat as necessary – Backpack around foundation, window casings, door frames and eaves.
- ECO WPX – power rig-roses, hibiscus, citrus, fruit trees, conifers and/or other problem areas.
- ECO Exempt - granules

May 4th /June 13th

- Termidor – New label – backpack- foundation only (1ft. up & 1 ft. out).
- ECO IC – Inspect and/or treat as necessary. Backpack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection show necessary.
- ECO Exempt – granules.

June 15th / July 25th

- Termidor – New label – backpack- foundation only (1ft. up & 1 ft. out).
- ECO IC – Inspect and/or treat as necessary. Backpack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection show necessary.

- ECO Exempt – granules.

July 27th / Sept 5th

- Optigard Flex-backpack- foundation and other areas of the property where deemed necessary.
- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection show necessary.

September 7th / October 17th

- Optigard Flex-backpack- foundation and other areas of the property where deemed necessary.
- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection show necessary.

Begin 2010 Treatments

October 19th / November 21st

- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection show necessary.

November 23rd / January 2nd

- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – spray citrus trees, rose bushes, hibiscus, fruit trees, conifers and other necessary plantings.

January 4th /February 13th

- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – spray citrus trees, rose bushes, hibiscus, fruit trees, conifers and other necessary plantings.

February 15th /March 27th

- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – spray citrus trees, rose bushes, hibiscus, fruit trees, conifers and other necessary plantings.

APPENDIX V

Beginning Survey-IPM Route 2008 Lloyd PC

	Yes	No		
Were you satisfied with your ant control in 2007?	164	3		
Would you pay more for ant management service that uses “green” techniques and, consequently less pesticide?	85	74		
Had you tried to control your own ant problem before contacting a pest control company?	122	44		
If we provided a website with info about non-pesticide techniques to control ants, would you visit the site?	106	55		
	Efficacy	Less Pe st.		
Which is more important to you when you have trouble with ants?	137	28		
	None	Light	Mod	Heavy
How would you rate your ant problems indoors?	139	23	7	0
How would you rate your ant problem outdoors	49	86	32	5
Surveys Mailed	419			
Surveys Received	168			

APPENDIX VI

Summary Reports from Alliance Team
Pest Management Professional Companies and
UC Extension



Clark Pest Control (CPC) Customer Satisfaction Response and Demographic/Geographic Summary

Route Dynamics

CPC conducted their portion of the PMA in the Greater Sacramento Metro area in the city of Rancho Cordova. The two routes serviced accounts that are located in areas that are close to the American River with some properties sharing a property line with the American River Parkway. This is a relatively affluent area with most of residents falling into the middle class range of income. The neighborhood is approximately 15-20 years old resulting in established landscape and mature trees.

The IPM route serviced, on average, 186 accounts per month while the conventional route serviced an average of 214 accounts over the duration of the grant. These numbers are acceptable for our organization for routes of these locations and demographics.

The IPM route utilized the product EcoPCO WP-X (botanically based product) in the truck mounted applicator using, during the summer, 1 pound per 50 gal tank. We also used permethrin in a one gallon compressed air applicator applied in limited quantities around the eaves and other parts of the structure. Fipronil was applied in limited quantities for ants on an as needed basis.

The conventional route utilized Cy-Kick (cyfluthrin) in the truck mounted applicator. This route also used permethrin in a one gallon compressed air applicator used in more liberal manners than the IPM route and used more Fipronil by volume (applied per label directions) than the IPM route.

Clark found both of these routes to be comparable with all applicable factors: time, material usage, call back/stop rates, customer satisfaction, technician satisfaction, etc. This is a direction that Clark is moving on a large scale and has used this grant to demonstrate that this shift can happen with the appropriate amount of time and training.

Customer Satisfaction Response

As part of CPC's participation in the PMA that was overseen by Dr. Rust, a customer satisfaction component of the alternative/IPM/reduced impact service must be given to determine the long term viability of a service such as this. After some analysis and thought, a customer survey would not give the information that was originally sought. The survey was looking for the customer's satisfaction with the ant control strategies of their service provided by Clark. CPC does not segment their services into various pests. We looked for ways to establish their

satisfaction with our organization and our service because Clark views any and all interactions equally.

Our IPM route has been performing this service for the past two plus years so comparing data against the previous year would not yield the information that we are looking for. We compared the call back rates for the two routes and saw that the conventional route was a little bit higher but still within an acceptable range. These two routes were comparable to the rest of the organization as well. We also saw the stop percentages were very similar. Through conversations that were conducted with the customers at the times of services and through supervisor QA visits, we found that the customers were very happy with our service and our company.

Overall, I can say with confidence that the level of customer satisfaction with both services and both technicians were comparable and both were rated on a high level. Please find the numbers that I am referring to in the attached spreadsheet.

Grant Feedback

While I understand the goal of the grant was very specific in addressing pyrethroid usage for ant control, Clark does not segregate our services that simply. We have had to work to provide you with the information that you are looking for. I believe that we have been able to do that, but our customers purchase our services to manage all pests on the properties, not just ants. I hope that we have been able to demonstrate that we can meet your goal despite the use of pyrethroids for spider control. This has not been affected due to the lack of viable, economic alternatives for this pest. I also understand that while DPR does not want a shift in products (away from pyrethroids to something else) that will be an un-intended effect of this type of work.

LLOYD PEST CONTROL

"GETTING THE BUGS OUT
SINCE 1931"

CORPORATE OFFICE
1202 MORENA BOULEVARD
SUITE 400
SAN DIEGO, CA 92110-3845
(800) 570-BUGS
(619) 275-2563 FAX

Re: DPR Final Report
From: Herb Field-Lloyd Pest Control
Date: 12 Feb 2010

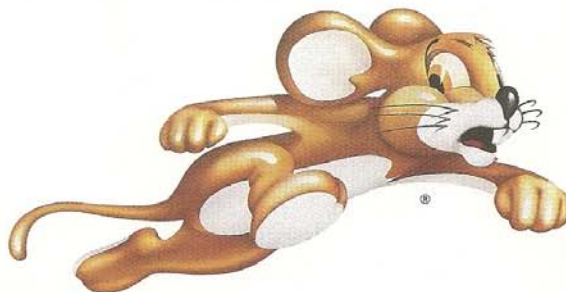
Lloyd Pest Control compared traditional ant control treatments to those that were considered an IPM approach in 2008 and 2009. The goal was to reduce the usage of synthetic pyrethroids by 50%. Additionally, applications on the IPM routes were designed to reduce pesticide in water run-off from the treated property.

The traditional residential client receives four treatments per year, two applications of fipronil timed at the very beginning of the ant season and the second at the height of the activity. In addition, two applications of a synthetic pyrethroid were applied in between the fipronil applications. Synthetic pyrethroid granules are also used around heavy ground cover where wet applications cannot penetrate. The typical route contains 500 accounts, but only 165 clients are serviced each month as they are on a quarterly service frequency. We service all residential clients on this frequency as it helps reduce pesticide usage and exposure to the client. When comparing pesticide usage on a client that is receiving monthly applications to quarterly there is at least a 66% pesticide reduction on that specific property. We have found that our 16,000 residential clients appreciate the reduced exposure while still having their pest ant populations under control.

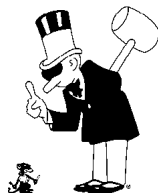
In 2008, the use of "no spray zones" was applied on the IPM routes. The approach was to eliminate specific areas around the residential property to reduce indiscriminate applications and reduce potential run-off. Areas that were eliminated included 10-12 feet from the curb and concrete aprons around the turf. Pesticide usage was reduced greatly but controlling the applications with the present spraying equipment became problematic and we realized that this approach would be difficult to control in the field if all 200 applicators were required to follow this procedure.

In 2009, we removed nearly all synthetic pyrethroid usage on the IPM routes and replaced the alternate applications between fipronil with EcoSmart IC-2 on one IPM test route and EcoSmart WPX on another IPM test route. The remaining pyrethroid use was from granular product used in heavy foliage and flea treatments. During the season we began to have problems with spider control and lawn burning from the IC-2 and mid season replaced IC-2 with WPX on the second test route. By the end of the season we had reduced synthetic pyrethroid usage over 90%. Our call back numbers, when a client calls for additional free service covered under their contract, was in line with our traditional route work. This indicates that even though we greatly reduced our synthetic pyrethroid usage our pest ant control effectiveness was at least as good as our traditional treatments.

A conversation about pesticide use and it's effectiveness for a PMP can only be half the dialogue. Every PMP will always ask about the relative cost of the treatment program they are presently using compared to a program that removes the relative inexpensive synthetic pyrethroids. In our studies we experienced chemical costs per route to be relatively the same between the traditional treatment and the IPM routes.



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FAX (714) 533-1199 www.west-ext.com

April 13, 2010

Western Exterminator wants to thank UCR and DPR for putting together this opportunity to test practical IPM controls for ants.

2008

We picked two routes in Orange County, both near the coast. The routes were primarily residential, the main pest of concern was ants. We wanted a program we could duplicate throughout the Company and went with a control strategy that emphasized the use of plant oils rather than Pyrethroids. To make it realistic as possible the tech on the "low Pyrethroid" route was told to emphasize the use of plant oils, but we left the actual choice of materials up to him. The data supports a 50% plus reduction in Pyrethroids can be done and the customer still judged the ant control approach a success. The conventional route averaged 0.69 pounds of Pyrethroid (active ingredient) per 100 stops where as the low Pyrethroid route averaged 0.24 pounds per 100 stops, a 65% reduction.

Although small in numbers the customer ratings were positive on both routes. The technician on the low Pyrethroid route told me the plant products worked, although he did on 38 occasions use a Pyrethroid. It was also encouraging that the tech on the low Pyrethroid route did not over rely on Termidor to make up for any perceived weakness of the plant oils. The low Pyrethroid route averaged 0.07 pounds of Termidor (active ingredient) per 100 stops, the conventional route 0.14 pounds per 100 stops.

2009

Again using two Orange County residential routes with a similar set up as in 2008, but with the low Pyrethroid route tech told to cut back on using Termidor. The low Pyrethroid route averaged 0.02 pounds of Termidor (active ingredient) per 100 stops, the conventional route 0.11 pounds per 100 stops. Unfortunately, when the low Pyrethroid route tech starting getting calls from his customers about ants, the tech, rather than using more Termidor, fell back to using more Pyrethroids. The conventional route averaged 0.22 pounds of Pyrethroid (active ingredient) per 100 stops where as the low Pyrethroid route averaged 0.16 pounds per 100 stops, still a 27% reduction when compared to the 2009 conventional route and a 77% reduction from the 2008 conventional route. Along with an increase in Pyrethroid usage by the low Pyrethroid route (.02 pound per 100 stops more than in 2008) the reason for the percentage reduction is the "conventional" route used less Pyrethroids, a 68% reduction when compared to 2008.

So was this approach a success? Yes, and in January 2010 we switched all our day routes over to this approach where the emphasis is on plant oils and other low impact products serve as insect baits. We call this approach Reduced Impact Pest Control.

Keith Willingham, B.C.E.
Vice President Technical Services
Western Exterminator Company
305 N. Crescent Way
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Corky's Pest Control, San Marcos

How did we choose our IPM routes?

We specifically chose routes in different climatic areas to fully test the feasibility of this IPM program.

Our five routes include the following areas: Inland and Coastal San Diego, Inland and Coastal Los Angeles, and Inland San Bernardino.

IPM Strategy

We used the "new label" Termidor applied only with a backpack around the foundation; this application will not exceed 1 ft. up or 1 ft. out.

From May-July we used ECO Exempt Granules in sunny areas and Mother Earth Scatter Bait in shaded areas around the outside property perimeter to repel crawling insects from our customer's properties as a regular treatment. This treatment was repeated as we deem necessary.

We used our sub-surface probe to probe out any ant colonies found while inspecting our customers' properties. This is a six-inch needle attached to the end of the power rig.

We used Excite R either as a kicker in ECO IC or ECO WPX; it was sometimes be used alone depending on staining issues. We used ECO Exempt dust and other botanical insecticides in various forms. We always inspected and/or treated as necessary any areas of concern or infestation. We did not use any insect baits.

March 23rd /May2nd

- ECO IC – Inspect and/or treat as necessary – Backpack around foundation, window casings, door frames and eaves. WE used this product while searching for the one we wanted to use. In July, after the Termidor usage, we changed to I-MaxxPro 2F.
- ECO WPX – power rig-roses, hibiscus, citrus, fruit trees, conifers and/or other problem areas.
- ECO Exempt – granules in sunny areas/ Mother Earth Scatter Bait in shaded areas.

May 4th /June 13th

- Termidor – New label – backpack- foundation only (1ft. up & 1 ft. out).
- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R will be added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection showed it necessary.
- ECO Exempt – granules in sunny areas/ Mother Earth Scatter Bait in shaded areas.

June 15th / July 25th

- Termidor – New label – backpack- foundation only (1ft. up & 1 ft. out).

- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R was added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection showed it necessary.
- ECO Exempt – granules in sunny areas/ Mother Earth Scatter Bait in shaded areas.

July 27th / Sept 5th

- I-MaxxPro 2F-backpack- foundation and other areas of the property where deemed necessary.
- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R was added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection showed it necessary.

September 7th / October 17th

- I-Maxx Pro 2F-backpack- foundation and other areas of the property where deemed necessary.
- ECO IC – Inspect and/or treat as necessary. Back pack – window casings, door frames and eaves. Excite R was added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection showed it necessary.

Begin 2010 Treatments

Our 2010 treatments begin in October so that our customers being serviced on a twelve week basis get the appropriate winter treatments.

October 19th / November 21st

- ECO IC – Inspected and/or treated as necessary. Back pack – window casings, door frames and eaves. Excite R was added as necessary.
- ECO WPX – power rig- landscape, conifers and under other trees and plants where inspection showed it necessary.

November 23rd / January 2nd

- ECO IC –Back pack – window casings, door frames and eaves. Excite R was added as necessary.
- ECO WPX – sprayed citrus trees, rose bushes, hibiscus, fruit trees, conifers and other necessary plantings.

January 4th /February 13th

- ECO IC – Back pack – window casings, door frames and eaves. Excite R was added as necessary.
- ECO WPX – sprayed citrus trees, rose bushes, hibiscus, fruit trees, conifers and other necessary plantings.

February 15th /March 27th

- ECO IC –Back pack – around foundation, window casings, door frames and eaves. Excite R was be added as necessary.

- ECO WPX – sprayed citrus trees, rose bushes, hibiscus, fruit trees, conifers and other necessary plantings.

Findings

We believe that our normal application techniques reduce the number of re-sprays on a regular basis no matter what chemical is used. The primary reason is because of where, how and what we do on each property. For example, treating certain plants and shrubs at a specific time of year will reduce the number of plant sucking insects, which in turn will reduce the target insects, ants and spiders.

We have found an increase in re-sprays in these five routes as compared with our regular routes. On average our re-sprays are about 0.9% collectively. So far our specified five routes have reported a re-spray rate of 1.4%, one re-spray for every 74 jobs.

Cost

Even though the cost of our botanical (non-pyrethroid) chemicals is slightly higher, we have noticed a slight decrease in overall cost on our IPM jobs. This has occurred with this new procedure because of the decreased amount of chemistry used on each property. The amount of time spent on each job has stayed constant.

Date: Wed, 14 Apr 2010
To: Donald Reiersen <donald.reiersen@ucr.edu>
From: Cheryl Wilen <cawilen@ucdavis.edu>
Subject: PMA

Don,

I do not have much to add to the report but since you asked: I think the program worked well. I think I will be writing an article about it for the CAPCA Adviser Magazine to spread the word. There needs to be some additional follow-up to move it to a more PCOs but the grant did not really allow for this because of the time frame. I was very pleasantly surprised that the participating PCOs were so willing and generous to supply and share time, personnel, and other tangible and intangible items to make this work.

See you at our next meeting

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Cheryl

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